

**Application for Permit for Scientific Purposes under the Endangered
Species Act of 1973**

**A MARK-RECAPTURE EXPERIMENT TO IMPROVE THE
ESCAPEMENT ESTIMATE FOR FALL CHINOOK SALMON IN
THE DESCHUTES RIVER, OREGON**

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EXPERIENCE AND EXPERTISE OF KEY PROJECT PERSONNEL

This project will be implemented by the CTWSRO Department of Natural Resources. Chris Brun will develop the detailed operational plan, secure necessary permits, provide logistical support, supervise fieldwork and data analysis and be responsible for project reporting. Lyman Jim will assist with project logistics and planning, supervise the field crew during project implementation and assist with final report preparation.

The project leader for the CTWSRO will be Christopher Brun:

- Lewis and Clark College. B.S. Environmental Studies (1988)
- Oregon State University. Post. Bac. Fisheries (1991)
- Fisheries Biologist, USFS, 6 years.
- Fisheries Biologist for the CTWSRO, 1996 to present.
Project leader for fall Chinook salmon abundance monitoring in lower Deschutes River basin, 2000 to present.

The lead technician for the project will be Lyman Jim:

- Fisheries II Technician, 1995 to present. Implemented fall Chinook salmon research projects from 1998 to present.
- Lead technician for CTWSRO Northern Pike Minnow crew.
- Served in U.S. Army, 1985 to 1989.
- Tribal fisher in Columbia River gillnet fishery.

PROJECT DESCRIPTION

The goal of this mark-recapture experiment is to estimate the abundance of fall Chinook salmon spawning in the watershed of the Deschutes River in 2007 such that the estimate will be within $\pm 30\%$ of the true value 95% of the time. This project has been implemented annually since 2002. Incidental take of Mid-Columbia summer steelhead was covered under ESA Section 7 Consultation (Number F/NWR/2001/01426). The consultation expired in December 2006. We are applying for a ESA 10a1a Permit for Scientific Purposes to cover project activities during 2007-2012.

Columbia River upriver bright fall Chinook salmon are a major contributor to southeast Alaska and Canadian fisheries. The status of these populations is a concern for Parties to the Pacific Salmon Treaty. The objectives of this project are specified by Article X, Section 1, of the Pacific Salmon Treaty. The goal of this project is to determine the accuracy of the existing method of estimating fall Chinook salmon escapement in the Deschutes River, Oregon. The project was initiated at the request of the U.S. Chinook Technical Committee (USCTC) of the Pacific Salmon Commission to verify data standards for escapement indicator stocks. The USCTC, through NOAA, provides funds for this project. Please refer to attached 2007 project proposal for details. Similar projects are being implemented for other fall Chinook salmon escapement indicator stocks in Alaska, Washington and Oregon.

A major objective of this project is to reduce the incidental catch of adult summer steelhead during first event sampling. In 1999 we used angling to capture adult fall Chinook salmon for marking. However this method had an unacceptable level of steelhead by-catch and it was abandoned as a capture technique in subsequent years. Beach seining was evaluated as a capture technique but the lack of suitable seining habitat without a likelihood of high steelhead by-catch precluded its use.

During 2000 we assessed the feasibility of using gillnets to mark adult fall Chinook salmon. We located a first event sampling site at Rkm. 32 that was known not to be steelhead holding habitat. We experimented with 3 gillnet mesh sizes and found 8" webbing reduced our steelhead catch without introducing an appreciable size selectivity bias for fall Chinook salmon. Second event sampling i.e. carcass surveys should not effect summer steelhead because they will not be encountered.

PROJECT METHODOLOGY

The project is a mark-recapture experiment used to estimate the escapement of adult fall Chinook salmon in the Deschutes River. A set gillnet is used to capture the fish for marking during first event sampling. Fish are inspected for marks and recaptured during second event sampling by carcass surveys and at two established fish traps.

First Event Sampling- Lower River Marking

Adult fall Chinook salmon will be captured in a set gillnet (Rkm 32) as they immigrate into the lower Deschutes River between 6 August and 19 October 2007-2012. The dimensions of the gillnet are 27 m long by 6 m deep, constructed of 7.5 in (190.5 mm) stretch, clear monofilament webbing hung at a 2:1 ratio and weighted down with 120 (54 kg) pound leadline. The use of large diameter webbing is intended to reduce summer steelhead by-catch. One end of the net is attached to the shore line while the other end dangles freely in a large deep-water eddy. The net will be fished by a crew of two between the hours of 05:00 - 10:00 and 17:00-23:00 seven days per week. The net is constantly observed while it was fishing. Usually at least two float corks would bob when a fish became entangled in the net. During the night and early morning hours the net is scanned every five minutes with a 1000 watt halogen lamp. The net is physically checked every 15-30 minutes to ensure no fish are captured undetected and to remove debris from the net. Crews of two will remain on site 24 hrs. per day during a 4 day shift.

Captured fall Chinook salmon are immediately removed from the net and placed in a partially submerged sling inside a 190 l holding container. If fish are entangled more severely than by their teeth the net webbing is severed to facilitate quick removal from the net. A submersible water pump is used to revive lethargic fish by forcing water over their gills while they are processed in the holding tank. No anesthetic is used.

All captured fall Chinook salmon are sampled for age, sex and length prior to marking. Time, date, water temperature and release condition are also recorded. Two length measurements are recorded: mid-eye to hypural plate (MEP) and fork (FK). Both lengths are recorded to the nearest 0.5 cm. Sex is estimated from secondary maturation characteristics. The presence or absence of an adipose fin is noted. Two to three scales are taken from the third row above the lateral line between the posterior of the dorsal fin and anterior of the anal fin from both the right and left sides of the fish. A total of four to five scales are taken from each fish. Scales will be placed in individual envelopes that are labeled with the sex, fork length and tag number. The scales will be later mounted on gum cards that hold scales from 20 fish. The age of each fish is determined by the pattern of circuli observed on images of scales impressed into acetate cards magnified 70X. Age analysis is performed by the ODFW, Clackamas scale lab.

Fall Chinook salmon with an intact adipose fin captured in a healthy condition are given three marks: a uniquely numbered solid-core spaghetti tag, a single thread t-bar Floy tag and a 6 mm diameter operculum punch. All marks are applied to the left side of the fish. The three marks allowed for detection of primary tag loss. The spaghetti tag consists of 5.71 cm section of laminated Floy tubing shrunk onto a 38 cm long piece of 80 lb test monofilament fishing line. The monofilament is sewn through the back just behind the dorsal fin and secured by crimping both ends of the monofilament with a metal line crimp. The excess monofilament is removed. Each spaghetti tag is individually numbered and stamped with a CTWSRO phone number. The Floy tags are a single thread, 7 cm long. A solid color other than used at the Sherar's falls marking station is used. The Floy tags are inserted between the fin rays below the anterior portion of the dorsal fin. The operculum punch is applied to the dorsal quadrant of the operculum with an oversized paper punch. The tagging equipment is sterilized in a solution of betadine after each fish is processed to reduce disease transmission.

Total handling time does not exceed 5 minutes per fish. All other fish species captured in the net are immediately released after species, fork length, origin and condition upon release are recorded. All captured fish are released in a calm eddy 200 m upstream of the gillnet.

Second Event Sampling

Fall Chinook salmon examined in the harvest, at Sherar's trap, at Pelton trap and during carcass sampling will constitute the number captured for the total river estimate. Sport and tribal harvest will be monitored at Sherar's Falls and additional sport harvest will be recorded at the mouth of the Deschutes River and at Mack's Canyon Road, to provide accurate in-river catch estimates.

Systematic sampling at the Sherar's Falls trap (Rkm 71) will occur four days a week (Monday through Thursday) from 0900 – 2400 hours. Sampling will begin July 15 and cease October 31. Sampling begins on July 15 to collect data on steelhead, and very few Chinook are expected to be caught between July 15 and August 15. After fish ascend the steep-pass ladder, they slide down a chute into an anesthetic tank. All captured fall

Chinook salmon will be examined for marks and measured to fork length. Fish in good condition will be tagged with two Floy anchor tags, one with a numbered vinyl sleeve and one bare monofilament. The few fish tagged at Sherar's Falls before the beginning of the gillnet capture effort downstream will be censured from the escapement estimates used to compare fish per redd above and below the Falls. A hole will be punched in the ventral posterior quadrant of the right operculum of all fish to signify being sampled at the Falls. After processing, fish will be placed into an open pen in quiet water above the Falls so they can recover and leave on their own volition.

All fish (both large and small) swimming into Pelton trap (Rkm 161) will be enumerated and examined for tags and secondary marks. A single monofilament tag of another color than used at Rkm 32 and at Sherar's Falls will be placed next to the dorsal fin before the fish is released into the river. This will allow carcass recovery crews to differentiate fish that have been previously examined for tags at Pelton trap. These fish will be excluded from the carcass recovery sample. Recoveries from Pelton and Sherar's traps will be incorporated into the recaptures for the total escapement estimate.

Fall Chinook salmon carcasses will be recovered from throughout the Deschutes River. Surveys will be conducted 4-5 days per week beginning in late-October and continuing through December. The Deschutes River will be sampled weekly. The river will be divided into survey reaches (Rkms: 8-32, 32-64, 128-160). The reach in which carcasses are recovered will be recorded. Crews will gaff the carcasses from the river while in a jet-sled or walking the riverbank. All recovered carcasses will be closely examined for the presence of tags, secondary marks and CWT. Sex, fork and MEF lengths, and approximate location of capture will be recorded. After processing, the carcasses will be cut in half to prevent re-counting during subsequent surveys and returned to the river.

Monitoring of harvest in sport and tribal fisheries will occur at Sherar's Falls. Based upon pre-season forecasts sport harvest will be open throughout the season until October 31. The sport fishery will be monitored by a random creel survey conducted by ODFW. Tribal fishing will be open through December 31, seven days per week. A random creel survey stratified by weekdays and weekend days will be conducted by the CTWSRO to estimate harvest in the tribal subsistence fishery. Two weekdays and one weekend day will be randomly selected for sampling each week. Weekday and weekend samples will be expanded biweekly and added together to estimate total harvest. Samplers will check all harvested fall Chinook salmon for tags and secondary marks. The number of untagged and tagged fish harvested (non expanded numbers) will be recorded.

2007 Project Timeline:

1 April –30 May: Develop and complete the project operational plan.

1 April - 30 June: Hire field crew, prepare gear, purchase supplies.

06 August – 25 October: Capture and tag adult fall Chinook salmon in the lower Deschutes River.

28 October – 29 December: Conduct carcass recoveries and redd surveys.

01 December: Issue progress report at annual USCTC meeting.

1 January – 28 February 2008: Analyze data. Issue draft technical report. Submit 6 month progress report to NOAA.

The project is funded through 2007. After review of 2002-2007 project results the USCTC and basin managers will decide whether to continue the project through 2012. It is anticipated that the decision to implement the project in subsequent years will be made during the spring, 2008.

DESCRIPTIONS AND ESTIMATES OF TAKE

Table one displays the number of wild and hatchery summer steelhead incidentally captured during first event sampling during 2001-2006 sampling. Mortalities are those fish that were incidentally captured and died in the gillnet. For example during 2001 a total of 19 wild steelhead were captured and of those 19 two died.

Table 1. Incidental summer steelhead by-catch during first event escapement sampling with total wild and hatchery adults captured and mortalities and estimated run sizes 2001-2006.

Year	Wild	Wild Morts	Hatchery	Hatchery Morts	Est. Wild Esc.	Est. Hatchery Esc
2001	19	2	30	2	8,749	31,784
2002	12	0	14	0	9,363	23,004
2003	9	1	9	0	5,524	11,511
2004	5	1	1	1	3,161	9,356
2005	6	0	6	3	3,432	10,497
2006	5	0	6	1	NA	NA

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
MCR Summer Steelhead	Adult	Wild	Capture, handle, release	50	5 out of 50	Deschutes River Oregon	August- October
MCR Summer Steelhead	Adult	Hatchery	Capture, handle, release	50	5 out of 50	Deschutes River Oregon	August- October

Cooperative Breeding Program:

The CTWSRO is willing to participate in a cooperative breeding program and to maintain or contribute data to a breeding program, if such action is requested.

Previous or Concurrent Activities Involving Listed Species:

This project was authorized for take of MCR summer steelhead ESU during 2001-2006 under ESA section 7 Consultation Number F/NWR/2001/01426.

Certification:

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA."

XX-ChrisBrun

Signature

4/12/07

Date

Chris Brun, CTWSRO Fisheries Biologist
Name and Position Title (print)